CLAIMS

1. A touch-input type liquid crystal display device having a liquid crystal display (~~2~~) below a touch panel (~~1~~), in which an upper polarizer (~~8~~) is disposed on an upper surface of a transparent touch panel (~~1~~) in which an upper optical phase difference film (~~4~~) and a lower optical phase difference film (~~6~~) are disposed with a space layer (~~7~~) interposed therebetween, the upper optical phase difference film (~~4~~) serving to give a phase delay of a 1/4 wavelength to incident light of a center wavelength within a visible region and having a movable electrode portion (~~3~~) on a lower surface thereof, and the lower optical phase difference film (~~6~~) serving to give a phase delay of a 1/4 wavelength to the incident light of the center wavelength within the visible region and having a stationary electrode portion (~~5~~) on an upper surface thereof; and

a lower polarizer (~~9~~) is disposed on a lower surface of the liquid crystal display (~~2~~),

wherein an angle formed by an optical axis of the upper optical phase difference film (~~4~~) and a polarization axis of the upper polarizer (~~8~~) is about 45°, an angle formed by an optical axis of the lower optical phase difference film (~~6~~) and linearly polarized light that is to be outputted from a device surface out of linear polarization emitted from the liquid crystal display (~~2~~) is about 45°, an angle formed by

the optical axis of the upper optical phase difference film (~~4~~) and the optical axis of the lower optical phase difference film (~~6~~) is about 90°, and wherein an angle formed by the polarization axis of the upper polarizer (8) and linearly polarized light that is to be outputted from the device surface out of linearly polarized light emitted from the liquid crystal display (~~2~~) is 90°.

2. A touch-input type liquid crystal display device according to Claim 1, wherein the stationary electrode portion (~~5~~) is formed directly on the lower optical phase difference film (~~6~~).

3. A touch-input type liquid crystal display device according to Claim 1, wherein a glass substrate (~~11~~) having optical isotropy is disposed between the stationary electrode portion (~~5~~) and the lower optical phase difference film (~~6~~), and the stationary electrode portion (~~5~~) is formed directly on the glass substrate (~~11~~) having optical isotropy.

4. A touch-input type liquid crystal display device according to Claim 1, wherein an optically isotropic film (~~12~~) is disposed between the stationary electrode portion (~~5~~) and the lower optical phase difference film (~~6~~), and the stationary electrode portion (~~5~~) is formed directly on the optically isotropic film (~~12~~).

5. A touch-input type liquid crystal display device according to Claim 2, wherein both the upper optical phase

difference film ~~(4)~~ and the lower optical phase difference film ~~(6)~~ have a thermal deformation temperature of not less than 150°C.

6. A touch-input type liquid crystal display device according to Claim 2, wherein both the upper optical phase difference film ~~(4)~~ and the lower optical phase difference film ~~(6)~~ have a thermal deformation temperature of not less than 170°C.

7. A touch-input type liquid crystal display device according to Claim 3, wherein the upper optical phase difference film ~~(4)~~ has a thermal deformation temperature of not less than 150°C.

8. A touch-input type liquid crystal display device according to Claim 3, wherein the upper optical phase difference film ~~(4)~~ has a thermal deformation temperature of not less than 170°C.

9. A touch-input type liquid crystal display device according to Claim 4, wherein both the upper optical phase difference film ~~(4)~~ and the optically isotropic film ~~(12)~~ have a thermal deformation temperature of not less than 150°C.

10. A touch-input type liquid crystal display device according to Claim 4, wherein both the upper optical phase difference film ~~(4)~~ and the optically isotropic film ~~(12)~~ have a thermal deformation temperature of not less than

170°C.

11. A touch-input type liquid crystal display device according to ~~any one of~~ Claim~~s~~ 1 ~~to 10~~, wherein a transparent resin plate (~~16~~) having optical isotropy is disposed between the transparent touch panel (~~1~~) and the liquid crystal display (~~2~~).

12. A touch-input type liquid crystal display device according to Claim 4, ~~9 or 10~~, wherein a transparent resin plate (~~16~~) having optical isotropy is disposed between the optically isotropic film (~~12~~) and the lower optical phase difference film (~~6~~).

13. A touch-input type liquid crystal display device according to ~~any one of~~ Claim~~s~~ 1 ~~to 12~~, wherein a thickness of the upper optical phase difference film (~~4~~) is not less than 50 μm and not more than 150 μm.

14. A touch-input type liquid crystal display device according to ~~any one of~~ Claim~~s~~ 1 ~~to 13~~, wherein either one of a member on which the stationary electrode portion (~~5~~) has been directly formed and the liquid crystal display (~~2~~); and all of the stationary electrode portion-directly-formed member and the liquid crystal display and a member disposed between the stationary electrode portion-directly-formed member and the liquid crystal display are adhesively bonded overall by a transparent adhesive layer or a transparent re-peel sheet.

15. A touch-input type liquid crystal display device according to ~~any one of~~ Claim~~s~~ 1 ~~to 14~~, wherein a transparent film (~~22~~) low in moisture permeability and superior in dimensional stability is laminated on an upper surface of the upper polarizer (~~8~~).

16. A touch-input type liquid crystal display device according to Claim 15, further comprising a low-reflection processed layer (~~23~~) on an upper surface of the transparent film (~~22~~) laminated on the upper surface of the upper polarizer (~~8~~).

17. A touch-input type liquid crystal display device according to Claim 15, further comprising an antifouling processed layer (~~24~~) on an upper surface of the transparent film laminated on the upper surface of the upper polarizer (~~8~~).

18. A touch-input type liquid crystal display device according to Claim 15, further comprising a hard coat processed layer (~~25~~) on an upper surface of the transparent film laminated on the upper surface of the upper polarizer (~~8~~).

19. A method for fabricating a touch-input type liquid crystal display device having a liquid crystal display (~~2~~) below a touch panel (~~1~~), wherein in the liquid crystal display device, an upper polarizer (~~8~~) is disposed on an upper surface of a transparent touch panel (~~1~~) in which an

upper optical phase difference film ~~(4)~~ and a lower optical phase difference film ~~(6)~~ are disposed with a space layer ~~(7)~~ interposed therebetween, the upper optical phase difference film ~~(4)~~ serving to give a phase delay of a 1/4 wavelength to incident light of a center wavelength within a visible region and having a movable electrode portion ~~(3)~~ on a lower surface thereof, and the lower optical phase difference film ~~(6)~~ serving to give a phase delay of a 1/4 wavelength to the incident light of the center wavelength within the visible region and having a stationary electrode portion ~~(5)~~ on an upper surface thereof; and a lower polarizer ~~(9)~~ is disposed on a lower surface of the liquid crystal display ~~(2)~~; wherein an angle formed by an optical axis of the upper optical phase difference film ~~(4)~~ and a polarization axis of the upper polarizer ~~(8)~~ is about 45°, an angle formed by an optical axis of the lower optical phase difference film ~~(6)~~ and linearly polarized light that is to be outputted from a device surface out of linear polarization emitted from the liquid crystal display ~~(2)~~ is about 45°, an angle formed by the optical axis of the upper optical phase difference film ~~(4)~~ and the optical axis of the lower optical phase difference film ~~(6)~~ is about 90°, and wherein an angle formed by the a polarization axis of the upper polarizer ~~(8)~~ and linearly polarized light that is to be outputted from the device surface out of linearly

polarized light emitted from the liquid crystal display (2) is 90°,

the method comprising:

obtaining a movable-side sheet by, after performing a heat treatment for removal of residual solvents in film material of the upper optical phase difference film (4), forming a transparent electrically conductive film for the movable electrode portion (3) directly on the film material, and after performing a heat treatment for reducing dimensional errors involved in formation of leads, forming leads of the movable electrode portion (3), and further performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the ink,

obtaining a stationary-side sheet by, after performing a heat treatment for removal of residual solvents in film material of the lower optical phase difference film (6), forming a transparent electrically conductive film for the stationary electrode portion (5) directly on the film material, and after performing a heat treatment for reducing dimensional errors involved in formation of leads, forming leads of the stationary electrode portion (5), and further performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the

ink,

laminating together the movable-side sheet and the stationary-side sheet;

then laminating the upper polarizer ~~(8)~~ on an upper surface of the upper optical phase difference film ~~(4)~~ of the movable-side sheet and thereafter performing a pressure degassing process; and

laminating together the stationary-side sheet with the liquid crystal display.

20. A method for fabricating a touch-input type liquid crystal display device having a liquid crystal display ~~(2)~~ below a touch panel ~~(1)~~, wherein in the liquid crystal display device, an upper polarizer ~~(8)~~ is disposed on an upper surface of a transparent touch panel ~~(1)~~ in which an upper optical phase difference film ~~(4)~~ and a lower optical phase difference film ~~(6)~~ are disposed with a space layer ~~(7)~~ interposed therebetween, the upper optical phase difference film ~~(4)~~ serving to give a phase delay of a 1/4 wavelength to incident light of a center wavelength within a visible region and having a movable electrode portion ~~(3)~~ on a lower surface thereof, and the lower optical phase difference film ~~(6)~~ serving to give a phase delay of a 1/4 wavelength to the incident light of the center wavelength within the visible region and having a stationary electrode portion ~~(5)~~ on an upper surface thereof; and a lower

polarizer ~~(9)~~ is disposed on a lower surface of the liquid crystal display ~~(2)~~, wherein an angle formed by an optical axis of the upper optical phase difference film ~~(4)~~ and a polarization axis of the upper polarizer ~~(8)~~ is about 45°, an angle formed by an optical axis of the lower optical phase difference film ~~(6)~~ and linearly polarized light that is to be outputted from a device surface out of linear polarization emitted from the liquid crystal display ~~(2)~~ is about 45°, an angle formed by the optical axis of the upper optical phase difference film ~~(4)~~ and the optical axis of the lower optical phase difference film ~~(6)~~ is about 90°, and wherein an angle formed by the polarization axis of the upper polarizer ~~(8)~~ and linearly polarized light that is to be outputted from the device surface out of linearly polarized light emitted from the liquid crystal display ~~(2)~~ is 90°,

the method comprising:

obtaining a movable-side sheet by, after performing a heat treatment for removal of residual solvents in film material of the upper optical phase difference film ~~(4)~~, forming a transparent electrically conductive film for the movable electrode portion ~~(3)~~ directly on the film material, and after performing a heat treatment for reducing dimensional errors involved in formation of leads, forming leads of the movable electrode

portion (~~3~~), and further performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the ink,

obtaining a stationary-side sheet by forming a transparent electrically conductive film for the stationary electrode portion (~~5~~) directly on a glass substrate (~~11~~) having optical isotropy, forming leads of the stationary electrode portion (~~5~~), and performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the ink;

laminating together the movable-side sheet and the stationary-side sheet;

then, laminating the upper polarizer (~~8~~) on an upper surface of the upper optical phase difference film (~~4~~) of the movable-side sheet and thereafter performing a pressure degassing process; and

laminating together the stationary-side sheet with the liquid crystal display with the lower optical phase difference film (~~6~~) interposed therebetween.

21. A method for fabricating a touch-input type liquid crystal display device having a liquid crystal display (~~2~~) below a touch panel (~~1~~), wherein in the liquid crystal display device, an upper polarizer (~~8~~) is disposed on an upper surface of a transparent touch panel (~~1~~) in which an upper optical phase difference film (~~4~~) and a lower optical

phase difference film ~~(6)~~ are disposed with a space layer ~~(7)~~ interposed therebetween, the upper optical phase difference film ~~(4)~~ serving to give a phase delay of a 1/4 wavelength to incident light of a center wavelength within a visible region and having a movable electrode portion (3) on a lower surface thereof, and the lower optical phase difference film ~~(6)~~ serving to give a phase delay of a 1/4 wavelength to the incident light of the center wavelength within the visible region and having a stationary electrode portion ~~(5)~~ on an upper surface thereof; and a lower polarizer ~~(9)~~ is disposed on a lower surface of the liquid crystal display ~~(2)~~, wherein an angle formed by an optical axis of the upper optical phase difference film ~~(4)~~ and a polarization axis of the upper polarizer ~~(8)~~ is about 45°, an angle formed by an optical axis of the lower optical phase difference film ~~(6)~~ and linearly polarized light that is to be outputted from a device surface out of linear polarization emitted from the liquid crystal display ~~(2)~~ is about 45°, an angle formed by the optical axis of the upper optical phase difference film ~~(4)~~ and the optical axis of the lower optical phase difference film ~~(6)~~ is about 90°, and wherein an angle formed by the a polarization axis of the upper polarizer ~~(8)~~ and linearly polarized light that is to be outputted from the device surface out of linearly polarized light emitted from the liquid crystal display ~~(2)~~

is 90°,

the method comprising:

obtaining a movable-side sheet by, after performing a heat treatment for removal of residual solvents in film material of the upper optical phase difference film ~~(4)~~, forming a transparent electrically conductive film for the movable electrode portion ~~(3)~~ directly on the film material, and after performing a heat treatment for reducing dimensional errors involved in formation of leads, forming leads of the movable electrode portion ~~(3)~~, and further performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the ink,

obtaining a stationary-side sheet by, after performing a heat treatment for removal of residual solvents in film material of an optically isotropic film ~~(12)~~, forming a transparent electrically conductive film for the stationary electrode portion ~~(5)~~ directly on the film material, and after performing a heat treatment for reducing dimensional errors involved in formation of leads, forming leads of the stationary electrode portion ~~(5)~~, and further performing a heat treatment for curing of binder of ink with which the leads have been formed, as well as for removal of solvents of the ink,

laminating together the movable-side sheet and

the stationary-side sheet;

laminating the upper polarizer ~~(8)~~ on an upper surface of the upper optical phase difference film ~~(4)~~ of the movable-side sheet and thereafter performing a pressure degassing process; and

laminating together the stationary-side sheet with the liquid crystal display with the lower optical phase difference film ~~(6)~~ interposed therebetween.

22. A method for fabricating a touch-input type liquid crystal display device according to ~~any one of~~ Claim~~s~~ 19 ~~to 21~~, wherein the heat treatment for removal of the residual solvents in the film materials is performed at a temperature of not less than 150°C.

23. A method for fabricating a touch-input type liquid crystal display device according to ~~any one of~~ Claim~~s~~ 19 ~~to 22~~, wherein the heat treatment for reducing dimensional errors involved in the formation of the leads is performed at a temperature of not less than 100°C and less than 130°C.

24. A method for fabricating a touch-input type liquid crystal display device according to ~~any one of~~ Claim~~s~~ 19 ~~to 23~~, wherein the heat treatment for curing of the binder of the ink with which the leads have been formed, as well as for removal of the solvents of the ink is performed at a temperature of not less than 100°C and less than 150°C.

25. A method for fabricating a touch-input type liquid crystal display device according to ~~any one of~~ Claim~~s~~ 19 ~~to 24~~, wherein the pressure degassing process is performed at 40 - 80°C and 4 - 9 kg/cm^2 for 10 - 120 minutes.

26. A method for fabricating a touch-input type liquid crystal display device according to ~~any one of~~ Claim~~s~~ 19 ~~to 25~~, wherein electrode-routed portions are preparatorily provided in either one of the movable electrode portion ~~(3)~~ and the stationary electrode portion ~~(5)~~, and after laminating together the movable-side sheet and the stationary-side sheet, and pressed against and adhered to a connector ~~(40)~~ via an anisotropic conductive adhesive at a temperature of not less than 120°C and less than 170°C.

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